

Atty. Docket No. 2001-0021-06
USSN 10/650,578

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (currently amended): A high repetition rate production quality gas discharge laser system with jitter control, said system comprising:

- A) a laser chamber comprising:
 - 1) a laser gas,
 - 2) a pair of elongated electrodes defining a discharge region,
 - 3) a fan for recirculating said laser gas between said electrodes,
 - 4) a heat exchanger for removing heat from said laser gas;
- B) a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;
- C) a controller means ~~to for~~ controlling jitter of all or substantially all of said discharges to an accuracy of ~~within 10 to~~ less than 20 ns or less; and
- D) said laser system comprising a light source component for an application ~~another system~~.

2.-7. (canceled).

8. (currently amended): A laser system as in Claim 1 wherein said application laser system is a ~~light source in a~~ reticle writing system.

9. (currently amended): A laser system as in Claim 1 wherein said application laser system is a ~~light source in a~~ reticle inspection system.

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10. (currently amended): A laser system as in Claim 1 wherein said ~~application~~ laser system is a ~~light source in a~~ wafer inspection system.

11. (original): A laser system as in Claim 1 wherein said pulse power system comprises a subcircuit including a peaking capacitor bank and the two electrodes wherein said subcircuit has an inductance of less than 5 nH.

12.-20. (canceled).

21. (currently amended): A high repetition rate production quality gas discharge laser system with jitter control, said system comprising:

A) a laser chamber comprising:

- 1) a laser gas,
- 2) a pair of elongated electrodes defining a discharge region,
- 3) a fan for recirculating said laser gas between said electrodes,
- 4) a heat exchanger for removing heat from said laser gas;

B) a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;

C) a controller means ~~to for~~ controlling jitter of all or substantially all of said discharges to an accuracy of ~~less than~~ within 10 to 20 ns or less; and

D) said controller means comprising:

means for adjusting the light delay from input trigger to laser light emission due to electrical discharge based at least in part upon the temperature of electrical components in the pulse power system.

22. (previously presented): The apparatus of claim 21 further comprising:
the electrical components comprising at least one magnetic circuit element.

23. (currently amended): A high repetition rate production quality gas discharge laser

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system with jitter control, said system comprising:

- A) a laser chamber comprising:
 - 1) a laser gas,
 - 2) a pair of elongated electrodes defining a discharge region,
 - 3) a fan for recirculating said laser gas between said electrodes,
 - 4) a heat exchanger for removing heat from said laser gas;
- B) a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;
- C) a controller means ~~to for~~ controlling jitter of all or substantially all of said discharges to an accuracy of less than ~~within 10 to 20 ns or less~~; and
- D) said controller means comprising:
 - means for adjusting the light delay from input trigger to laser light emission due to electrical discharge based at least in part upon the charging voltage of the pulse power system.

24. (currently amended): A high repetition rate production quality gas discharge laser system with jitter control, said system comprising:

- A) a laser chamber comprising:
 - 1) a laser gas,
 - 2) a pair of elongated electrodes defining a discharge region,
 - 3) a fan for recirculating said laser gas between said electrodes,
 - 4) a heat exchanger for removing heat from said laser gas;
- B) a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;
- C) a controller means ~~to for~~ controlling jitter of all or substantially all of said discharges to an accuracy of less than ~~within 10 to 20 ns or less~~; and
- D) said controller means comprising:
 - means for adjusting the light delay from input trigger to laser light emission due to electrical discharge based at least in part upon both the temperature of at least one electrical component in the pulse power system and the charging voltage of the pulse power system.

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25. (previously presented): The apparatus of claim 24 further comprising:
the at least one electrical component comprising at least one magnetic circuit element.

26. (currently amended): A high repetition rate production quality gas discharge laser system with jitter control, said system comprising:

A) a laser chamber comprising:

- 1) a laser gas,
- 2) a pair of elongated electrodes defining a discharge region,
- 3) a fan for recirculating said laser gas between said electrodes,
- 4) a heat exchanger for removing heat from said laser gas;

B) a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;

C) a controller means ~~to for~~ controlling jitter of all or substantially all of said discharges to an accuracy of less than ~~within 10 to 20 ns or less~~; and

D) said controller means comprising:

means for adjusting the light delay from input trigger to laser light emission due to electrical discharge based at least in part upon the charging voltage set for the upcoming discharge and a timing error determined for the just occurred discharge.

27. (currently amended): A high repetition rate production quality gas discharge laser system with jitter control, said system comprising:

A) a laser chamber comprising:

- 1) a laser gas,
- 2) a pair of elongated electrodes defining a discharge region,
- 3) a fan for recirculating said laser gas between said electrodes,
- 4) a heat exchanger for removing heat from said laser gas;

B) a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;

C) a controller means ~~to for~~ controlling jitter of all or substantially all of

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said discharges to an accuracy of ~~less than within 10 to 20 ns or less~~; and

D) said controller means comprising:

means for adjusting the light delay from input trigger to laser light emission due to electrical discharge based at least in part upon a charging voltage set for the upcoming discharge and a timing error determined for the just occurred discharge, or upon the charging voltage in the pulse power system or upon a combination of these, and wherein the degree of adjustment is subject to a weighting factor that varies depending upon whether or not the timing error is outside the range of 10 to 20 ns.

28. (currently amended): A method of operation of a high repetition rate production quality gas discharge laser system with jitter control, said system comprising:

A) utilizing a laser chamber comprising:

- 1) a laser gas,
- 2) a pair of elongated electrodes defining a discharge region,
- 3) a fan for recirculating said laser gas between said electrodes,
- 4) a heat exchanger for removing heat from said laser gas;

B) utilizing a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater; and

C) utilizing a controller for controlling jitter of all or substantially all of said discharges to an accuracy of ~~less than within 10 to 20 ns or less~~.

29. (currently amended): A method of operation of a high repetition rate production quality gas discharge laser system utilizing jitter control, said method comprising:

A) utilizing a laser gas chamber comprising:

- 1) a laser gas;
- 2) a pair of elongated electrodes defining a discharge region;
- 3) a fan for circulating said laser gas between said electrodes;

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4) a heat exchanger for removing heat from said laser gas;

B) utilizing a pulse power system for providing high voltage ~~electrical~~ electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;

D) utilizing a controller for controlling jitter of all or substantially all of said discharges to an accuracy of ~~less than~~ ~~within 10 to 20 ns or less~~, by adjusting the light delay from input trigger to laser light emission due to electrical discharge based at least in part upon a charging voltage set for the upcoming discharge and a timing error determined for the just occurred discharge, or upon the charging voltage in the pulse power system or upon a combination of these, and wherein the degree of adjustment is subject to a weighting factor that varies depending upon whether or not the timing error is outside of the range of 10 to 20 ns and,

whereas said laser chamber is contained in an easily replaceable module.

30. (currently amended): A high repetition rate production quality gas discharge laser system with jitter control, said system comprising:

A) a laser chamber comprising:

- 1) a laser gas,
- 2) a pair of elongated electrodes defining a discharge region,
- 3) a fan for recirculating said laser gas between said electrodes,
- 4) a heat exchanger for removing heat from said laser gas;

B) a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;

C) a controller means ~~to for~~ controlling jitter of all or substantially all of said discharges to an accuracy of ~~less than~~ ~~within 10 to 20 ns or less~~; and

wherein said most of said pulse power system is contained in an easily replaceable module.

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31. (currently amended): A high repetition rate production quality gas discharge laser system with jitter control, said system comprising:

A) a laser chamber comprising:

- 1) a laser gas;
- 2) a pair of elongated electrodes defining a discharge region;
- 3) a fan for recirculating said laser gas between said electrodes;
- 4) a heat exchanger for removing heat from said laser gas;

B) a pulse power system for providing high voltage electrical pulses to produce discharges across said electrodes at repetition rates of 1000 Hz or greater;

C) a controller means ~~to-for~~ controlling jitter of all or substantially all of said discharges to an accuracy of less than ~~within 10 to 20 ns or less~~; and

wherein all or substantially all components of said laser system are contained in easily replaceable module.